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NUCLEAR DIVISION
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cy: H. H. Abbe
I. G. Speas

800758
800814

June 15, 1973

United States Atomic Energy Commission
Attention: Mr. C. A. Keller, Director
Uranium Enrichment Operations Division
Post Office Box E
Oak Ridge, Tennessee 37830

Gentlemen:

Radionuclide Release Data - Diffusion Plants

In response to your letter of May 18, the requested information for the Oak Ridge and Paducah Gaseous Diffusion Plants follows:

ORGDP

1. Three gaseous release points were reported for 1972.

The K-1420 drum dryers (effluent release point identity number 004) discharge through a stack approximately 40 feet above the roof line and 80 feet above ground level. Since the 1972 report, the ventilation system at K-1420 has been remodeled. The drum dryer exhaust presently discharges through another blower which has a capacity of 1800 scfm. Instead of a gross volume of $7.413 \times 10^7 \text{ ft}^3$, as reported previously, the new gross volume is approximately $1.96 \times 10^8 \text{ ft}^3$. The drum dryers discharge continuously through the above blower approximately 7 hours each day, 5 days per week. The uranium is in the form of a mist having the chemical formula $\text{UO}_2(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ (uranyl nitrate - hexahydrate).

The K-311-1 purge cascade (effluent release point identity number 005) discharges through a stack approximately 17 feet above the roof line and 75 feet above ground level. The flow rate is 3300 scfm. The UF_6 which is discharged reacts with moisture in the atmosphere to immediately form UO_2F_2 . The release point is a continuous discharge 24 hours each day.

APPROVAL FOR RELEASE

Document: # Unnumbered; Date 6/15/73;
Title/Subject Letter, RG Jordan to CA Keller (AEC-
Oak Ridge), "Radionuclide Release Data -
Diffusion Plants" -- 4 pages

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K-25 Classification & Information Control Officer

2/1/93
Date

No. 1133

The K-1302 stack (effluent release point identity number 006) discharges through a brick stack approximately 75 feet above ground level. The flow rate is 65,000 scfm. The UF_6 which is discharged reacts with moisture in the atmosphere to immediately form UO_2F_2 . The facility operated approximately 16 weeks during 1972. Twenty-minute batch discharges occurred approximately six times per week.

2. Three liquid release points for uranium were reported for 1972. The uranium at all locations is in the form of dissolved solids containing the UO_2 ion.
3. The AMAD is not known since measurements have not been made to determine this parameter.
4. Stack discharges are sampled isokinetically into an aqueous medium. Periodic calibration checks are made of the flow-measuring equipment used in sample collection. Analyses are performed colorimetrically employing a spectrophotometer.

The water sampling apparatus is a Black Clawson-Krofta pneumatic stainless steel sampler. The unit is cone-shaped and collects a sample every 20 minutes proportional to the flow over a rectangular weir. The water samples are removed from the collection barrel weekly and are composited monthly on a flow-rated basis. Analyses are performed fluorophotometrically after concentrating by solvent extraction.

Precision and accuracy of laboratory measurements are evaluated continuously by a quality control program. The program is independently administered and involves the analysis of disguised levels of the contaminant. Calibration checks of the equipment used in the analyses are also made periodically to maintain adequate control.

PGDP

| 1. | <u>Emission No.</u> | <u>Stack Height (ft)</u> | <u>Flow Rate (scfm)</u> | <u>Form</u> | <u>Discharge Frequency*</u> |
|----|---------------------|--------------------------|-------------------------|----------------|-------------------------------------|
| | ØYUCA001001A | 70 | 800 | UF_6 | Continuous |
| | ØYUCB001003A | 95 | 50 | UF_6 | Continuous |
| | ØYUCB001004A | 35 | 6,350 | UO_2F_2 | Intermittent (1-2 hrs/shift) |
| | ØYUCB001005A | 52 | 6,800 | UF_4 | 24-hr continuous @ 248 days/year |
| | ØYUCB001006A | 45 | 9,250 | UF_4 | 24-hr continuous @ 248 days/year |
| | ØYUCB001007A | 83 | 9,250 | UO_3, U_3O_8 | 24-hr continuous @ 248 days/year |

| <u>Emission No.</u> | <u>Stack Height (ft)</u> | <u>Flow Rate (scfm)</u> | <u>Form</u> | <u>Discharge Frequency*</u> |
|---------------------|--------------------------|-------------------------|--|-------------------------------------|
| ØYUCB001008A | 83 | 5,650 | UF ₄ | 24-hr continuous @ 248 days/year |
| ØYUCC001009A | 20 | 1,600 | UF ₄ , UO ₃ , UO ₂ F ₂ | 14 hrs/day batch @ 248 days/year |
| ØYUCD001011A | 120 | 2,300 | UF ₄ | 24 hrs/day continuous @ 353 days/yr |
| ØYUCD001012A | 120 | 5,000 | UF ₄ | 24 hrs/day continuous @ 353 days/yr |
| ØYUCD001013A | 80 | 4,800 | UF ₄ , U ₃ O ₈ | Batch 3,000 hrs/yr |
| ØYUCD001014A | 30 | 13,000 | U ₃ O ₈ | Batch 3,000 hrs/yr |
| ØYUCD001015A | 80 | 6,800 | U ₃ O ₈ | Batch 3,000 hrs/yr |
| ØYUCD001016A | 80 | 6,000 | U ₃ O ₈ | Batch 3,000 hrs/yr |
| ØYUCD001017A | 80 | 14,000 | U ₃ O ₈ | Batch 3,000 hrs/yr |
| ØYUCD001018A | 80 | 15,000 | U ₃ O ₈ | Batch 3,000 hrs/yr |
| ØYUCD001019A | 35 | 2,000 | U ₃ O ₈ | Batch 3,000 hrs/yr |

*Normal Frequency of Operation - Estimate

| <u>2. Emission No.</u> | <u>Form*</u> |
|------------------------|---------------------------------------|
| ØYUCC001021L | Uranyl ion |
| ØYUCD001022L | Uranyl ion + Suspended Uranium Oxides |
| ØYUDE001023L | Uranyl ion |
| ØYUCF001024L | Uranyl ion + Suspended Uranium Oxides |

*Probable forms of uranium present in liquid.

3. Activity Median Aerodynamic Diameter

Since most of the airborne releases are due to bag failure, the AMAD of the bulk of the particles is quite large. We estimate approximately 40-50 microns.

A small amount of the total emissions consists of particles that escape the bags (not during failure). The AMAD of these particles is estimated to be about 1 micron.

June 15, 1973

4. Brief Summary of Environmental Monitoring for Radioactive Materials

a. Airborne Emissions

A record is kept of the emission of radioactive materials from the stacks. The stacks are sampled by isokinetic samplers and the samples analyzed by C-710 Laboratory. During lab analysis, duplicates and blanks are run.

b. Liquid Emissions

Certain batch effluents are sampled prior to release. Streams into which plant wastes are discharged are monitored by a continuous, proportional sampler. Samples are analyzed for uranium by a fluorimeter in C-102 Industrial Hygiene Laboratory. During each batch of analyses, quality control "unknowns" are provided by the C-710 Laboratory. Also, the fluorimeter is calibrated by standards during each run.

We will be happy to supply any additional data you may need.

Very truly yours,



R. G. Jordan, Manager
Safety and Environmental Protection

RGJ:ayb

cc: Mr. P. C. Fourney
Mr. C. C. Hopkins
Mr. G. R. Jasny
Mr. P. R. Vanstrum
Mr. W. J. Wilcox, Jr.
Mr. R. A. Winkel

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(This section to be completed by ChemRisk)

Name S. Samilberg / Division ISD is requested to provide the following document

Address _____

Date of Request 12/10 Expected receipt of document 12/21

Title of requested document Radionuclide Release Data: Diffusion Plants

Document Number 800814

Access Number of Document _____ Date of Document June 15, 1973

(This section to be completed by Derivative Classifier)

Derivative Classifier R. G. Jordan Phone 41645

Date document transmitted to Dr. Quist 1/15/93 1/29/93

Date release received from Dr. Quist OK 082 1/29/93

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DOCUMENT DESCRIPTION (to be completed by requester)

Document number UNNUMBERED/800814

Pages 4

Document title RADIONUCLIDE RELEASE DATA - DIFFUSION PLANTS

Author(s) (indicate other divisions or organizations, if applicable) RG JORDAN

Document type (See Doc. Prep. Guide, Chs. 1 and 2, for definitions of document types):

- | | | | | |
|---|--|--|-----------------------------------|--|
| <input type="checkbox"/> Formal Report | <input type="checkbox"/> Progress Report | <input type="checkbox"/> Informal R&D Report | <input type="checkbox"/> Abstract | <input type="checkbox"/> Drawing |
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Date 1/14/93

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